



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/825,611	04/03/2001	Sujit Sharan	95-0716.02	3508
7590	12/30/2004		EXAMINER	
Charles Brantley Micron Technology, Inc. 8000 S. Federal Way Mail Stop 525 Boise, ID 83716			PERT, EVAN T	
			ART UNIT	PAPER NUMBER
			2829	
				DATE MAILED: 12/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/825,611	SHARAN ET AL.	
	Examiner Evan Pert	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 02 July 2004 (i.e. June 29, 2004).
- 2a) This action is FINAL.      2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 37-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 37-39 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 37-39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of the term "chemically inert reactability increaser" in claim 37 is ambiguous, even after intensely studying the specification and the record developed by the previous examiner:

Applicant's specification indicates at [0012]:

In one embodiment, a [reactability increaser] material reduces the partial pressure contribution of at least one other gas reacting in said process [i.e. basis for rejection in last Office Action]. In one exemplary embodiment, the material added is a generally inert gas, such as a noble gas that nevertheless encourages a reaction among other gases. In another exemplary embodiment, the material is inert with respect to the current reaction, although it may be chemically active in other reactions. In yet another exemplary embodiment, the material chemically reacts with the other gases.

Thus applicant ambiguously indicates that a so-called "reactability increaser," *may* be a noble gas, "may or may not react with other gases" and "may or may not be chemically reactive" in other situations, which is simply *ambiguous*.

In view of the claimed ambiguity, for purposes of examination, "a chemically inert reactability increaser" as claimed includes "argon, helium or any other noble gas that is excited in plasma, but is not chemically reacted with a deposition gas."

2. Claims 37-39 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01.

Claim 37 (as well as claims 38-39) omit essential ambiguous process steps that allow one of skill to understand how to practice the claimed method, wherein a noble gas is not just "chemically inert," but is also a "reactability increaser."

For purposes of examination, in view of the ambiguity of applicant's "chemically inert reactability increaser," any noble gas in a CVD system, that is part of deposition, including maintaining or stabilizing plasma, is considered as falling within the ambiguous scope of "chemically inert reactability increaser."

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 37-39 are rejected under 35 U.S.C. 102(b) as being anticipated by Akahori et al., as an example, in view of the interpretation under 35 USC 112, 2nd paragraph above:

Regarding claim 37, Akahori et al. disclose an atmosphere for plasma enhanced "chemical vapor deposition" (i.e. PECVD) comprising: a deposition gas having a chemical reactability (i.e. a "metallic gas" such as TiCl<sub>4</sub>); and a "chemically inert reactability increaser" (i.e. Ar) mixed with the deposition gas (e.g. abstract), wherein electrons dissociated from the Ar in plasma *necessarily* enhance/increase the reactability of the metallic gas [p. 5, lines 38-40].

Regarding claim 38, the deposition gas is a precursor gas because the titanium tetrachloride is a "precursor" material to the titanium nitride film being formed.

Regarding claim 39, the deposition gas is a "metal film precursor deposition gas" (because the "TiCl<sub>4</sub> deposition gas" used by Akahori et al. is called a "metal film precursor deposition gas" in applicant's one example in the specification).

### **Conclusion**

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nestor Ramirez can be reached on 571-272-2034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**EVAN PERT**  
**PRIMARY EXAMINER**

ETP  
December 23, 2004